

Project Proposal

Face Mask Detection Using Deep Learning
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1. Project Overview

This project focuses on developing a deep learning-based model to automatically detect whether individuals in images are wearing face masks or not. With the rise of global health concerns, automated detection plays a major role in improving public health safety. Manual monitoring is prone to human error, especially in large crowds.

2. Project Goal

The goal of this project is to build a deep learning model using Convolutional Neural Networks (CNN) capable of accurately detecting face masks in real-time. The system aims for over 90% accuracy, supporting healthcare and public safety monitoring applications.

3. Research Questions

- 1. Can AI accurately detect individuals not wearing face masks in real-time?
- 2. What are the most effective algorithms used in prior face-mask detection studies?
- 3. How do the accuracy and results of different studies compare across datasets and models?

4. Related Work Review

Several studies have explored automated face mask detection using CNNs and transfer learning. Popular models include MobileNetV2, ResNet50, VGG16 and custom CNN architectures. Most studies achieve accuracy between 90% and 98% depending on dataset quality and preprocessing methods.

Study	Algorithm	Dataset	Accuracy	Notes
Loey et al. (2021)	ResNet50	Medical Mask Dataset	92%	High precision on masked faces
Chowdary et al. (2020)	MobileNetV2	Kaggle Mask Dataset	97%	Fast and efficient transfer

				learning
Nagrath et al. (2021)	Custom CNN	Real-time video dataset	90%	Suitable for real-time deployment

3. Methodology & Approach

The methodology includes dataset acquisition from Kaggle, preprocessing, CNN model development, evaluation using accuracy, precision, recall, F1-score, and confusion matrix visualization. Transfer learning will also be tested.

4. Research Gap

Most prior studies achieve high accuracy but lack real-time deployment validation in crowded and low-light conditions. This project aims to address these limitations by enhancing preprocessing and testing across varied environments.

5. Project Timeline

- Week 1–2: Data collection and preprocessing
- Week 3–4: Model design and training
- Week 5: Evaluation and tuning
- Week 6: Report writing and finalization

6. Expected Results

A functional mask-detection model exceeding 90% accuracy, suitable for real-time monitoring in public environments.

7. References

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